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DECIDUOUS FRUIT INDUSTRY IN CHILE

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FOREWORD

In 1942, "The Fruit Industry of Chile," a study by Fred Motz, fruit marketing specialist, was published by the Foreign Agricultural Service. Since that time many changes have occurred in this industry and production of fruit has increased substantially.

The study is designed to aid in estimating and evaluating the production and export potential of this competing country. Chile ships peaches, nectarines, plums, cherries, and table grapes to the United States and other American countries and apples, prunes, pears, and table grapes to Europe.

DM Rubel

D. M. Rubel, Director
Fruit and Vegetable Division

Note: All conversions in this report from Chilean pesos to dollars are made at the official rate in effect during the 1957-58 harvest season--725 pesos equal $1.00. The Chilean peso is extremely unstable and free rates fluctuate day by day. The official rate is usually revised once or twice a season.

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DECIDUOUS FRUIT INDUSTRY IN CHILE

by Robert S. FitzSimmonds

INTRODUCTION

Chile, by virtue of its climate and its geographic position, is well adapted to the cultivation of all types of deciduous fruits. These are grown largely in the central region, between the desert expanses of the extreme north and the southern third of the country which suffers from rainfall generally too heavy for successful fruit culture. In this central region the warm dry summers, mild winters, adequate water for irrigation, and, in most sections, productive soils provide ideal conditions. Grapes and stone fruits abound in the northern part of this central region, apples and pears in the south.

Chile's producing season, because of its location in the Southern Hemisphere, occurs during the months when fruit is not available in areas close to the major world markets. Thus, Chile's exports meet relatively light competition. True, they must compete with fruit from Argentina, Australia, and other Southern Hemisphere countries, but the volume of fruit on world markets is lighter at this time than during the months when the Northern Hemisphere is in production. The fact that Chile's production corresponds with the "off season" in the United States has been one of the chief factors contributing to substantial shipments of Chilean fruit to the New York market.

The fruit industry of Chile, though small by comparison with that of the United States, is quite important to the Chilean economy. Deciduous fruit production, including grapes, makes up 25-35 percent of Chile's total agricultural output,* excluding meat and meat products. The Ministry of Agriculture estimated that in 1956 the total investment in fruit plantations was about $60 million and that an additional $14 million was invested in packing and processing plants, refrigerated storage depots, and so forth. In this same year, the income of workers in fruit producing and packing was about $3 million.

Chile, according to a 1955 census, has a total land area of about 183 million acres, of which about 76 million acres are used for agriculture. Of the 380,000 devoted to fruit culture in 1955, approximately 250,000 acres were in commercial vineyards, mostly wine grapes. Area in table and raisin grape varieties totaled about 12,000 acres. On the remaining acreage the major species grown were apples and peaches, with about 17,000 acres each; plums for drying, 8,000 acres; walnuts and pears, about 5,000 each; and apricots, cherries, plums for fresh consumption, and almonds, 2,500 each.

Since a large percentage of this production is destined for export markets, fruit contributes materially toward maintaining Chile's export-import position. Also, fruit crops account for between 25 and 35 percent of Chile's total agricultural income, excluding forestry. Income from vinifera grapes, including grapes for wine and raisins as well as for fresh consumption, equals almost 60 percent of the total fruit earnings.

EXPANSION OF THE INDUSTRY

Chile's deciduous fruit industry has the potential for substantial expansion, and recently the trend in this direction has been stressed. Reopening of world markets to Chilean fruit at the end of World War II stimulated production increases. But increases in exports did not materialize until the last year or so, when the Chilean Government set a more favorable exchange rate for fruit exports.

The expansion occurring in the Chilean fruit industry is apparent from the data shown in Table 2. With the single exception of peaches, every commodity listed shows an increase in total acreage, and acreage in production is up for all fruits. Moreover, except for plums and cherries, acreage in production now accounts for a larger proportion of the planted area. This indicates that new trees are being planted and many others are coming into bearing. Also, new trees are, in most cases, additional to existing plantings and not replacements. Thus, between the two periods, 1948-54 and 1955-56, total acreage went up 12 percent, the percentage producing, 7 percent.

During the war the industry became dependent upon the markets of the American countries, and these are still the leading markets, even though shipments to Europe have been resumed. The Chilean grower and exporter, except for apples and prunes, produces and packs mainly with the New York market uppermost in his mind. He is also interested in increasing shipments to other South and Central American countries.

Chile is actively seeking expansion of markets in Europe. Growers realize that if the expected substantial production increases are realized, a point of saturation of American markets may well materialize, and European markets will be of increasing importance. Too, European markets traditionally have been the best outlets for Chilean apples and prunes.

As further help in moving greater quantities of fruit, both the fruit industry and the government are striving to boost domestic consumption. This would provide an outlet for

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*Similitudes Entre Las Industrias Fruticolas de Hoja Caduca de California y Chile, Roy D. McCallum, I.C.A., Santiago, Chile.

TABLE 1.--Deciduous fruit: Estimated total acreage, yield, and production in Chile, by commodity, 1955-56 season

Fruit	Area		Average yield[1]	Production	
	Total	Producing		Total	Total marketed or processed[2]
	1,000 acres	*1,000 acres*	*Boxes per acre*	*1,000 boxes*	*1,000 boxes*
Apples	17.7	15.3	110	1,674.8	1,674.8
Pears	5.2	3.1	110	340	340
			Tons per acre	*1,000 tons*	*1,000 tons*
Apricots	2.9	2.5	2.3	5.7	--
Fresh	--	--	--	--	3.5
For drying	--	--	--	--	.3
Grapes, table	12.5	10.8	3.2	34.2	--
Fresh	--	--	--	--	32.0
For raisins	--	--	--	--	.6
Peaches and nectarines	16.2	13.8	2.6	36.4	--
Fresh	--	--	--	--	20.0
For canning	--	--	--	--	5.0
For drying	--	--	--	--	.7
Plums	10.0	8.6	--	19.0	--
Fresh	2.0	1.6	2.1	--	3.4
For drying	8.0	7.0	2.2	--	5.2
Cherries, sweet and sour	2.6	2.2	1.1	2.4	--
Fresh, sour	--	--	--	--	1.3
Dried, sweet	--	--	--	--	.3

[1] Yields expressed in terms of fresh fruit.

[2] For dried fruit calculated on basis of following fresh to dry relations: Grapes 4-1, peaches and nectarines 8-1, prunes 3-1, and cherries 3.5-1.

Departamento de Vitivinicultura y Fruticultura, Ministerio de Agricultura, Chile.

TABLE 2.--Deciduous fruit: Estimated acreage, total and producing in commercial plantings in Chile, average 1948-54 and season 1955-56

Fruit	Average 1948-54[1]			1955-56[2]		
	Area		Percent producing	Area		Percent producing
	Total	Producing		Total	Producing	
	1,000 acres	*1,000 acres*	*Percent*	*1,000 acres*	*1,000 acres*	*Percent*
Apples	14.8	11.9	80.4	15.6	14.8	94.9
Pears	3.7	1.9	51.4	5.4	3.5	64.8
Peaches and nectarines	14.8	11.9	80.4	14.8	13.3	89.9
Plums	8.6	7.7	89.5	10.1	8.6	85.1
For fresh consumption	1.2	1.0	83.3	1.5	1.2	80.0
For drying	7.4	6.7	90.5	8.6	7.4	86.0
Apricots	2.3	1.9	82.6	3.0	2.7	90.0
Grapes, table	8.6	6.9	80.2	8.9	7.9	88.7
Cherries, sweet and sour	1.7	1.6	94.1	2.5	2.0	80.0
Total	63.1	51.5	81.6	70.4	61.7	87.2

[1] Estimated by Comisión de Producción Frutal para el Plan Desarrollo Agrícola y Transporte de Chile.

[2] Estimated by Departamento de Vitivinicultura y Fruticultura, Ministerio de Agricultura de Chile.

fruit which does not quite meet export grade standards, a class which undoubtedly will show the highest percentage increases. Chile's rapidly growing population--about 2 percent or 140,000 persons per year--should contribute to this expansion of the domestic market.

FRUIT CULTURE

The deciduous fruit industry of Chile may be compared to that of California, although the area planted to fruit in Chile is only about 25 percent of that in California. In topography the two areas are similar. Fruit-growing in both takes place in a fertile valley lying between high mountains and a coastal range. Climate is much the same. The soils are similar too, being predominantly of alluvial origin and neutral reaction, although Chile's are usually shallower. The two areas produce substantially the same species of deciduous fruits, and those grown in Chile are by and large equal in quality to those grown in California.

Chile's central valley extends about 800 miles in length, ranges up to 30 miles in width, and contains two-thirds of Chile's arable land. Rivers that originate in the Andes and flow in a general westerly direction provide water to the valley. Extremes of heat or cold that would damage deciduous fruits do not occur here, and hail is not normally a factor. Spring rains occasionally interfere with fruit set, and rains in early fall may cut the harvest short. Sometimes frost during harvest and early spring causes damage in the southern districts.

Rainfall varies over the valley fruit districts from a maximum of about 4 inches a year in the north, increasing gradually to the south, with the maximum in Bio-Bio of about 45 inches a year. Throughout the entire valley rain falls almost entirely during the winter months of June, July, and August. Summers are dry, and consequently irrigation is needed even in high-rainfall areas.

Irrigation

All the main fruit-producing areas are irrigated. Water is adequate in all areas of the valley, and abundant in most, so additional acreage can be brought under irrigation readily. The rivers are tapped by canals and water is led by gravity through a system of secondary canals to the plantations. Irrigation systems usually do not include dams; catch basins are used only in the north.

Water is supplied to trees and vines by flooding in all areas except the southernmost one of Bio-Bio and Malleco. In this area, the soil is so porous that it is normally necessary to feed water from the canals and ditches into basins around each tree. Fortunately, this area, with the greatest need for water because of its soil type, is the area with the most abundant water supply, for the rivers carry a greater volume of water.

TABLE 3.--Deciduous fruit: Exports from Chile, average 1948-53 and annual 1954-57

Fruit	Average 1948-53	1954	1955	1956	1957
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Fruit, fresh:					
Apples	411	290	318	347	468
Pears	29	29	28	42	27
Peaches and nectarines[1]	28	31	40	31	58
	Tons	*Tons*	*Tons*	*Tons*	*Tons*
Grapes, table	2,794	2,224	2,734	4,723	5,300
Plums	540	871	619	718	585
Cherries, sour	60	75	1	17	38
Apricots	11	--	--	24	2
Fruit, dried:					
Prunes	3,261	2,979	4,200	2,234	4,262
Raisins	171	103	103	125	43
Peaches	100	45	82	41	58
Cherries, sweet	16	12	21	14	13
Fruit, canned:	*Cases*[2]	*Cases*[2]	*Cases*[2]	*Cases*[2]	*Cases*[2]
Peaches	8,421	8,160	14,140	22,857	39,972

[1] 1,000 bushels (48 lbs. net).

[2] Cases equivalent 24 No. 2-1/2 cans.

Official records Chilean customs.

Fertilization

Fertilizers are used in the orchards of Chile but normally fertilization is limited to nitrogenous products--Chilean nitrate and/or animal manure--which are available domestically. For example, in Curico about 5 pounds of Chilean saltpetre or its equivalent in manure is applied to each apple tree to provide the tree with approximately two-thirds pound of pure nitrogen. On the poor soils on which apples are generally grown this is an absolute necessity, particularly in the Angol-Los Angeles area where it is not possible to grow a cover crop without first applying nitrogen. Other chemical fertilizers are not used to any extent in orchards but phosphurus and potash are used extensively in vineyards.

Rates of application of fertilizers vary a great deal from area to area and year to year because of differences in soil types and availability of materials. They also vary from orchard to orchard within an area because of differences in the growers' ideas as to what is best. General statements on the average rates of application, therefore, would be of little value.

Spraying

The Chilean industry models its spraying program after that in use in the western United States and thus rates and timing of pesticide applications are the same as those used there. Parathion, Malathion, and DDT are the chemicals now most universally used in Chile. Results have been very satisfactory. Only recently has a major problem cropped up. Mites in certain areas are showing definite resistance to the organic phosphates and some changes in present methods will be required to counteract this resistance.

MARKETING

Cold Storage

Cold storage warehouses in Chile are about 95 percent owned and operated by the government, and total capacity is much below needs. Areas near the port time their shipments so that fruit can be loaded directly aboard ship upon its arrival at the dock. Thus, some congestion of storage space is avoided. From areas further away it is necessary to ship to cold storage at Valparaiso or at Santiago to be held until the ship is ready to load.

Cold storage capacity in the country outlined by Province is:

	Total capacity Boxes
Santiago	1,145,000
Valparaiso	610,000
Talca	45,000
Concepcion	350,000
Linares (just completed)	150,000
Other	30,000
Total	2,330,000

At least 20 percent of this total is used for commodities other than fruit. Thus, the maximum available capacity for fruit is only about 1.9 million boxes. Present plans call for the construction of six more warehouses but only one of them--the Linares plant--is completed. Some large growers have built storages to handle the needs of their own plants, but, in general private firms are not active in construction of cold storage warehouses. With storage rates low, it is not a profitable investment and efforts are centered on promoting construction by the government.

Commercial cold storage charges for fruit in Chile are relatively uniform. The rate is 27.00 pesos ($.04) per box initial charge, plus 2.00 pesos ($.003) per box per day.

Transportation

In Chile fruits are moved by both rail and truck. Rail movement is largely confined to fruit from the southernmost areas except for some grape movement in refrigerated cars. Roads in the northern and central part of the valley are much better than in the fruit areas of Argentina or in the south of Chile.

Chile is actively engaged in completing its part of the Pan-American highway, which will eventually provide a well-paved road running the full length of the country. This highway has been completed as far south as Parral, in Linares Province, and thus all fruit from the Curico area and those to the north moves by truck. From Angol, however, the movement is entirely by rail. When the highway reaches the Angol area, probably by the 1960 shipping season, it is quite likely that this area will also convert to motor truck movement.

There are about 20-30 refrigerated rail cars in Chile, and these are used during the season for moving grapes from Llay Llay and San Felipe to Valparaiso. This traffic will probably continue because most shippers now using rail have invested in ice plants for cooling the cars.

Domestic freight rate per box for apples to Valparaiso from Curico is 19¢ and from Angol, 32¢. Rates from the same areas to Santiago are 14¢ and 26¢, respectively. The rate for grapes from Aconcagua to Valparaiso is 6¢ per lug.

Export fruit moves by ship from the port of Valparaiso to other South American countries and through the Panama Canal to the east coast of the United States and to Europe.

TABLE 4.--Ocean freight rates: Valparaiso to United States and European ports, 1958

Commodity	Container	Gross weight	Cubic measurement	Rates Valparaiso, Chile, to--		
				U.S. Atlantic and Gulf ports	Scandinavia	European Continent
		Pounds		*U. S. dollars*	*U. S. dollars*	*U. S. dollars*
Apples	Box	50	1'8"	2.35	2.31	2.24
Pears	...do	50	1'6"	2.10	2.31	2.24
Peaches and nectarines.	Half case.	18	5"	.60	--	--
	Two-layer lug	20	8"	.95	--	--
Grapes	Lug					
	Excelsior.	26	1'3"	1.85	[1] 1.31	[1] 1.27
	Solid pack	24	10"	1.25	--	--
	Sawdust pack	31	1'2"	1.60	[1] 1.27	[1] 1.23
Plums	Two-layer lug	20	8"	.95	--	--
Cherries	Lug	13	6"	.70	--	--

[1] Per container rates computed from published rates of $42.00 to Scandinavia and $40.60 to European continent per cargo ton (40 cubic feet).

Currency Exchange, Export Taxes, and Government Controls

Until the past year, exports of fruit were held down by currency exchange restrictions and export taxes. Foreign earnings from fruit exports must be converted at the official exchange rate which is established by the Central Bank of Chile. This rate was, until recently, substantially below the free exchange rate. As a consequence, exporters were forced to set prices quite high in order to earn profitable returns in pesos. In some cases the resultant prices f. a. s. Valparaiso were higher than c. i. f. prices in Europe.

Last year, however, official exchange rates were raised to levels much closer to the free rates; also the Central Bank now adjusts the rate more frequently than was the practice in the past. In addition, fruit was freed of all export taxes, under a government program to promote exports. Total taxes in effect under previous decrees sometimes ran as high as 25-30 cents per pound.

During the 1957-58 season, the effective official exchange rate was set at 725.00 pesos per U. S. $1.00. At the same time, the free rate was at about 850.00 pesos per $1.00. This has been the approximate relationship since the new policy was announced--official rate slightly more than 100 pesos below the free rate. These actions have done much to encourage exports and have made it possible for Chile to promote activity designed to regain its lost markets. However, a problem will continue to exist until exports at free exchange rates are permitted.

Exporters must have export licenses and the fruit must have an inspection certificate. Licenses are granted freely and inspection is available to all. All sea freight must be paid in dollars, but after obtaining his export license the exporter can purchase dollars for this purpose.

CLASSIFICATION AND GRADING

Fruit for export in Chile is classified and graded by the packer and inspected by an official of the government inspection service at the port. Grade standards for fruit for export are formulated and published by the Department of External Commerce of the Ministry of Economy. These standards have, for the most part, been based on the standards in use in the United States.

Grade standards for export fruit have the force of law, and if fruit fails to meet export requirements when inspected at the port, it may not be exported. The following representative grades have been excerpted and translated from the official standards of Chile, "Reglamento de Exportacion de Frutas."

Apples

Apples for export are classified in two grades--Fancy and Standard for Export.

Fancy.--Apples of Fancy quality must be of one variety, harvested by hand, perfectly cleaned, uniform in size, color, and shape, of good confirmation, and firm ripe. They must be individually wrapped in oiled paper and packed in standard boxes. Label must include the name of the product, name, mark, and address of the exporter, and the words "Chile," "Producto de Chile," or "Manzanas[1] de Chile." Box must be stamped with grade, size, variety, producer identification and, if kept in cold storage, the letter F.

Standard for Export. --Apples of this quality must be of one variety, harvested by hand, more or less uniform in color, of uniform size and shape, clean, and firm ripe. Packing requirements are the same as for Fancy grade.

Color requirements. --Fruit must conform to color requirements on the following list; the percentage noted refers to the percentage of the fruit surface which must have the characteristic red color of the variety:

Variety	Fancy	Standard
	Percent	*Percent*
Hoover	50	25
Red Delicious	50	25
Winesap	50	20
King David	50	20
Glengyle Red	50	20
Jonathan	50	20
Delicious	33	10
Stayman Winesap	33	10
Rome Beauty	20	5

Defects listed below cannot total in each lot more than the stated tolerance for the individual type of defect and cannot total in aggregate more than 10 percent of items 1 thru 4 for both grades, nor more than 20 percent for Fancy and 30 percent for Standard on items 5 thru 10.

	Fancy	Standard
	Percent	*Percent*
1. Insect or disease damage	15	15
2. Overripe	2	2
3. Cut or damaged fruit	2	3
4. Fruit without stems	2	3
5. Bruised	5	5
6. Withered soft or dirty fruit	0	3
7. Deformed fruit	10	15
8. Hail or frost damaged	5	10
9. Poorly colored fruit	10	10
10. Off-size fruit	10	12
but not more than below size limits	5	6

Peaches and Nectarines

Peaches and nectarines for export are classified in only one grade--Standard for Export. Fruit of Standard for Export quality must be carefully picked by hand, of one variety, pleasing color and appearance, good uniform size and shape, clean and firm ripe.

The tolerances below cannot exceed the percentage shown for each type of damage or defect and in aggregate cannot exceed a total of 15 percent.

	Percent
Insect and disease damage	15
Cuts and punctures	5
Bruises	5
Deformed fruit	5
Off-size fruit	5

Weight. --Minimum net weight of a 2-layer lug of peaches shall be 8 kilos (18 lbs.) and of nectarines, 7 kilos (15 lbs.).

Packing. --Fruit must be individually wrapped in paper specially designed to reduce transpiration and inhibit infection of fruit. Paper must be sanitary, oiled, and may be stamped with the trademark of the producer or the exporter.

Table Grapes

Table grapes are classified for export in 3 grades--Extra Fancy, Fancy, and Standard for Export, Sawdust Pack.

Extra fancy. --Table grapes of this grade must be of one variety, with the color characteristic of the variety, berries sound and uniform. They must have the minimum sugar content required for each variety. The bunches must be well-formed and the stems green and fresh. Bunches are to be packed 1 or 2 in each package and 8 packages per lug.

Fancy. --Table grapes packed in this quality must be of one variety with its color characteristics, berries sound and uniform. They must have the minimum sugar content required for the variety. The bunches must be well-formed and the stems green and fresh. Bunches are to be packed 2 or 3 per package and 12 packages per lug.

Color requirements are the same as for Extra Fancy grade.

Standard for Export, Sawdust Pack. --Grapes must be of one variety with its color characteristics, the berries more or less uniform, sound and clean. They must contain the minimum sugar requirements for the variety. The bunches must be more or less well-formed and must have a minimum weight of 150 grams (1/3 lb.) each, stems green and fresh. These are the tolerances for defects or damage:

---

[1] Apples.

	Extra Fancy or Fancy	Standard
	Percent	*Percent*
Spots of fungus thrips or mites	([1])	([1])
Live insects	0	0
Decayed berries	0	0
	Maximum number of berries allowed in each 5 bunches	
Damaged or crushed berries	5	8
Soft berries	3	5
Berries raisiny or dirty	0	0

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[1] In each bunch, small spots of fungus, thrips, mites or other causes are allowed as follows: Extra Fancy or Fancy on 5 berries except on Almeria 10 berries. Standard on 10 berries, Almeria 15 berries.

Net weight. --Grapes packed for export must comply with following net weight requirements:

Quality	Required net weight of each lug
Extra Fancy and Fancy	8 kilos (18 lbs.), 7.5 kilos (16.5 lbs.) for Sultanina
Standard for Export	9 kilos (20 lbs.) approximately
Sawdust Pack	12 kilos (26 lbs.)

Melons

Melons are classified in two grades for export--Fancy or Jumbo and Standard for Export.

Fancy or Jumbo. --Melons of this grade must be of one variety, carefully selected, clean, well-formed, of uniform color and size, and firm ripe. Fruit will not be accepted if it has hail damage, sunburn, or has been damaged by insect attacks. Up to 10 percent defects which do not affect the appearance of the product will be accepted.

Standard for Export. --Melons of this grade must be of one variety, clean, well-formed, of uniform color and size, and firm ripe. Up to 20 percent defects which do not affect the keeping quality or the general appearance will be accepted.

Minimum weight. --The minimum weight of each case of melons for export shall be 18 kilos (40 lbs.) for Fancy or Jumbo and 14 kilos (30 lbs.) for Standard for Export.

Dried Prunes

Prunes are classified in two grades. --Fancy or Superior and Standard or Corriente.

Fancy or Superior. --Must be fruit of one variety, sound, clean, uniform, of dark color, more or less bright, with pulp dense and of light amber color, and of mellow consistency without air pockets. In this quality, no insects, mites, or fungus are tolerated nor are indications or manifestations of fermentation.

Standard or Corriente. --Must be fruit of one variety, sound, clean, approximately uniform, color more or less dark and more or less bright. Pulp dense and light amber in color of mellow consistency without air pockets. No insects, mites, or fungus are tolerated nor are indications of fermentation. The tolerances are:

	Fancy or Superior	Standard
	Percent	*Percent*
Cracked fruit	2	4
Broken fruit or pieces	2	3
Over dried fruit	1	2
Swollen or puffy fruit	1	1
Leathery fruit	[1] 5	10
Sugary or caramely fruit	0	0

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[1] May never exceed 1/4 of the surface of the fruit.

PRODUCING AREAS

Most fruit is grown on relatively large holdings. Some grow several different species of deciduous fruit; normally, however, holdings are more specialized as growers tend to concentrate on the species most adapted to their individual areas. Frequently in Chile, fruit production is a commercial enterprise carried out on specialized fruit farms. However, in most cases fruit is planted as an adjunct to other crops on general farms.

The major producing areas for table grapes, stone fruits, and melons are in the provinces of Aconcagua, Valparaiso, and Santiago. Also, Santiago and Aconcagua Provinces are important deciduous fruit-canning areas. South of these areas, the most important fruit is apples, though some pears, prunes, peaches, apricots, and cherries are grown. Important producing sections are in the provinces of Colchagua, Curico, Linares, Bio-Bio, and Malleco.

Aconcagua Province

The deciduous fruit-producing area of Aconcagua province is in the Aconcagua Valley, surrounding the towns of San Felipe and Los Andes. The valley is a relatively large one for this part of Chile. The most important deciduous fruit section is in the eastern end covering an area about 20 miles long and 5 miles wide and is surrounded by some of the highest peaks in the Andes. Mt. Aconcagua, the highest peak in the Americas, is in plain view from the valley floor.

Because of its soil and climate, the Aconcagua Valley is an excellent fruit region, well adapted to the cultivation of all types of deciduous fruit except apples. Some small plantations of apples exist in the province, however. The area produces chiefly table grapes and stone fruits. Provinces north of Santiago are not as well adapted to apples and pears as those further south as the low winter temperatures required by these fruits are generally lacking this far north. Aconcagua is the most important deciduous fruit-canning region.

Water is supplied by the Aconcagua River and is adequate for irrigating both existing acreage and the small expansion that can be foreseen in the near future. However, it is not overabundant and care is exercised in its use.

In general, the area has a need for improved and expanded packing facilities and enlarged cold storage capacity.

Valparaiso Province

The major fruit-producing area of Valparaiso Province is the Llay Llay Valley (pronounced Yi Yi). Llay Llay is a small bowl-shaped extension of the Aconcagua Valley, and it obtains water for irrigation from the Aconcagua River also. The valley measures about 5 miles each way and is almost surrounded by mountains. All of the land--about 12,000 acres--is under cultivation. The largest acreage is planted to table grapes, and other important crops are stone fruits--peaches and plums--and melons.

Water for irrigation is adequate to meet Valley needs but, as in Aconcagua, is not abundant. Catch basins are used to prevent runoff of night water and discretion is used in irrigating to conserve water. No intensification of this problem is expected to occur in the future as expansion of the area is not possible.

The soil of Llay Llay is similar in origin and composition to that of Aconcagua and is quite fertile. The area is peculiarly suited to the production of table grapes. Vines produce larger bunches of larger berries than in other areas, and the quality of Llay Llay grapes is equal to or better than those produced in California.

Some deciduous fruit is produced in other sections of Valparaiso Province but is generally in small scattered pockets.

Santiago Province

In recent years, the production of table grapes has increased in Santiago Province. Grapes of good quality are produced, although they are not quite equal to those of Llay Llay. Santiago Province is also important in the production of stone fruits and melons and in the canning of deciduous fruits. Fruit is not restricted to any particular area in Santiago and is important throughout the province, both north and south of Santiago City. Soils are variable in the Province but are generally of fertile sandy loam types.

Colchagua Province

The San Fernando area in Colchagua Province is one of the best and highest-yielding apple areas in Chile and the main important fruit-producing section of the province. Some few trees of other species are cultivated, namely pears, peaches, and prunes, but these are much less important numerically than apples.

Soils in some districts are deep and fertile but in most of the area they are only fair. Generally they are of volcanic origin.

Curico Province

The most rapidly expanding apple area in the country is in this province, stretching east from the city of Curico to the foot of the Andes. As in the San Fernando area, some other species are grown here, but these are not important in comparison to apples. Some pears and stone fruits were observed.

Water for irrigation is abundant and the area planted to apples is growing. In addition, most existing trees are young, and thus production shows a very rapid increase. Soils are relatively poor, consisting mainly of several inches of volcanic ash over a gravelly subsoil, consequently, yields are not high.

Linares, Nuble and Concepcion Provinces

A large grape-producing area is located in Linares Province. Total production is used to make wine, and, while this is a very important part of Chile's fruit industry, this study does not include the wine industry.

Elsewhere in these provinces there are about 1,200 acres of apples and slightly above 100 acres of pears. Orchards, however, are widely scattered and most of them are reached only with difficulty over poor roads. Packing and grading facilities are limited and inadequate.

Bio-Bio and Malleco Provinces

The oldest apple area in Chile is in these provinces, stretching from Angol to Los Angeles and surrounding sections. The first commercial plantings of apples in Chile were made here and the first apple-packing house was built by the government near Angol. The area is still primarily an apple producing section, though some pears are grown here.

Apples grown in this section are the highest quality and have the best appearance of any apples grown in Chile. Fruit shape is typical of the variety and most varieties size well. Red varieties develop extremely high color in this district. Yields, however, are very low as the soil is poor. In most cases, it consists of a few inches of volcanic ash over a subsoil of pure sand. When dry all these soils of volcanic origin are loose and very dusty, as they are finely pulverized.

All fruit moves by rail from Angol. The new highway has not yet been completed this far south and truck transport at present is not practical.

TABLE 5.--Table grapes, fresh: Exports from Chile, by country of destination, average 1948-52, annual 1953-56

Country of destination	Average 1948-52	1953	1954	1955	1956	1957
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Brazil	248	--	43	--	--	--
Canada	51	15	--	21	--	24
Denmark	--	--	--	19	149	195
Ecuador	190	168	126	301	401	261
Germany	--	--	15	76	252	74
Netherlands Antilles	12	7	7	4	7	--
Norway	--	--	--	--	--	234
Panama	90	38	10	--	49	28
Sweden	38	1,457	230	475	133	363
United States	1,566	1,964	1,684	1,618	3,395	3,836
Venezuela	349	249	109	218	262	231
Others	22	35	--	2	75	58
Total	2,566	3,933	2,224	2,734	4,723	5,304

Official Chilean customs records.

TYPES OF FRUIT

Table Grapes

Table grapes constitute Chile's most important export fruit crop. Production is centered in the triangle formed by the cities of Santiago, Valparaiso, and Los Andes. The major producing areas are Aconcagua Valley, Llay Llay Valley, and the area west and north of the city of Santiago.

Cultivation. --Grapes are grown by the parral system, which involves overhead arbors. Vines are trained to stakes and develop a strong central stem 6-1/2 to 7 feet tall. Canes from the top of the trunk are trained to overhead wires. Vines usually are set 10 x 10 feet, although some are 13 x 13, and Almerias are set 11 x 11.

Yields vary somewhat between areas but all are relatively high; in Llay Llay Valley, the average is about 85-90 pounds per vine, of which about 55 pounds is exportable quality.

The amount of irrigation water supplied per acre depends upon the age of the vines and the amount of rainfall which occurred just prior to the start of the dry growing season. In Llay Llay during the summer dry months--December through March--night water from the river is accumulated in catch basins to be used for irrigation the following day. On the average, vines are irrigated by the flood system 3 or 4 times during the season. In other areas the furrow system is used and vines may be irrigated as much as 6 times a year.

The harvesting of grapes for export starts in early February and carries through April. Picking and packing continues in most years until the rains start in mid- or late April. The first fall rain heralds the end of the season because mildews and other forms of decay take a heavy toll as soon as moisture is available. Thus, rains coming unseasonally early can and sometimes do cause heavy losses to growers.

Most varieties of grapes grown commercially in Chile produce on the average larger berries and larger bunches than the same variety produces in California. Taste, color, and over-all quality of the grapes are excellent. Cleaning and sorting prior to packing is carefully done.

Varieties.--Those grown for export are Emperor, Almeria, Ribier, and Thompson Seedless (Sultanina) and Flame Tokay (Angelino). Cardinal and several native Chilean varieties are grown for domestic consumption. It is interesting to note that Mr. Fred Motz, U.S.D.A. fruit marketing specialist, who surveyed the Chilean fruit industry in 1942, reported that the three leading grape varieties at that time were Torontel, Cuyana, and Rosada and that the first of these accounted for one-third of the total volume. Today these varieties are unimportant, although they are still grown to some extent for the home market.

Chilean growers have kept abreast of developments in the major markets and have planted the varieties which have the greatest demand. Those known in U.S. markets particularly have been accentuated.

Packing.--Grapes are put up in three different styles of pack labeled Fancy, Standard, and Sawdust Pack. Quality standards are high for all three of these packs. The major difference is that smaller bunches may be packed in Standard and Sawdust than in Fancy.

Fancy: Packed of large well formed bunches, each wrapped in tissue paper and nestled in excelsior. Packed in one layer in a large lug containing 18 pounds net weight. This pack is for export to the United States.

Standard: A solid pack, California style with no packing material in lug except heavy paper liners. Lug is packed with a net weight of 20 pounds, and is used for export to Peru, Venezuela, and other South American countries.

Sawdust Pack: Bunches are packed in sawdust in the same manner that this pack is handled in California. Boxes are packed with a net weight of 26 pounds and are intended for export to Europe.

Shipping.--Grapes for export are shipped mostly by rail from Llay Llay and Aconcagua but from Santiago truck movement is heavy. In either case, grower-packers time their operations to coincide with scheduled ship-sailing dates. Each has some cold storage space and packed grapes are held--generally for short periods--as packed. When the ship is ready, the grapes are loaded in late evening and shipped to arrive at the port before 8:00 a.m. the following day, when they are unloaded from the car or truck and, after inspection, loaded into the ship immediately. This usually occurs the day before the ship sails.

The movement from packing house to port and the stowage aboard ship are both in refrigerated space. The handling methods are good, so that fruit usually reaches destination in good condition and brings good prices.

Costs.--Growing and packing of grapes for export is considered to be one of the most profitable commercial enterprises in Chile today. This situation is, of course, a result of several years of strict quality control and the improvement of handling methods and facilities. Grape production is quite an expensive undertaking in Chile for the beginner. It is estimated that the cost of establishing and planting a vineyard is about one million pesos per hectare--nearly $600 per acre. This figure includes only the vines and the posts and wire to build the parral. It does not include the land, the packing facilities, or other necessary expenditures.

Cost data are not readily available in Chile as records are rather incomplete, particularly as applied to cultural costs. However, it was possible to determine average or representative packing costs for most areas. (Table 6).

Apples

Apples have been produced commercially in Chile for many years, and in some areas orchards are made up mostly of older trees. However, in recent years new plantings have been made and new varieties introduced which have greater demand and better acceptability in export markets.

For years, the leading varieties have been Hoover, a prolific producer of relatively low-quality apples, Delicious, and White Winter Pearmain. Now, Hoover and Delicious are declining and varieties such as Red Delicious, and Jonathan, Winesap, and Yellow Newtown are becoming of increasing importance. More highly colored strains of red varieties are preferred. Production of older varieties which have shown adaptability to Chilean conditions and are known and accepted in world markets has continued. Pearmain and King David are examples.

Referring again to Mr. Motz' 1942 report, it is also possible to outline the evolution of the apple industry. He reported that Huidobro was the most heavily planted variety in 1942 but that Delicious was the most popular variety and was rapidly replacing Huidobro. Today, Delicious is in turn being replaced by Red Delicious as is Hoover. At present, Hoover and Delicious are still varieties produced in the greatest volume but are on a definite downgrade.

Producing areas.--The important commercial apple-producing areas are the Angol-Los Angeles area in Bio-Bio and Malleco Prov-

TABLE 6.--Table grapes, fresh: Calculated packing costs in Chile per packed lug, by type of pack and cost item, 1957-58 season

Cost item	Fancy pack[1]		Standard pack[2]		Sawdust pack[3]	
	Pesos	*Dollars*	*Pesos*	*Dollars*	*Pesos*	*Dollars*
Packing labor	190.16	0.262	213.99	0.295	285.24	0.393
Lug	180.00	.248	140.00	.193	200.00	.276
Paper	60.00	.083	12.00	.017	40.00	.055
Lug liner	--	--	12.00	.017	--	--
Nails	5.00	.007	4.00	.006	5.00	.007
Excelsior	30.00	.041	--	--	--	--
Sawdust	--	--	--	--	180.00	.248
Label	20.00	.028	20.00	.028	20.00	.028
Cost of fruit	864.00	1.192	864.00	1.192	1,152.00	1.590
Total cost per lug f.o.b.	1,349.16	1.861	1,265.99	1.748	1,882.24	2.597
Ice car[4]	4.30	.006	3.00	.004	4.60	.006
Freight to Valparaiso[4]	40.00	.055	28.00	.039	40.00	.055
Export tax	35.00	.048	35.00	.048	40.00	.055
Total cost per lug f.a.s.	1,428.46	1.970	1,331.99	1.839	1,966.84	2.713

[1] Net weight 18 pounds.
[2] Net weight 20 pounds.
[3] Net weight 26 pounds.
[4] Total cost per car converted to lug basis on following average carloadings: Fancy 1,400 lugs per car; standard 2,000; sawdust pack 1,300.

TABLE 7.--Apples, fresh: Exports from Chile by country of destination, average 1948-53, annual 1954-56[1]

Country of destination	Average 1948-53	1954	1955	1956	1957
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Belgium	4	11	--	14	17
Bolivia	16	--	2	2	3
Ecuador	2	4	6	4	7
France	55	103	153	121	202
Germany	157	79	8	69	118
Peru	28	38	40	32	58
Sweden	95	46	87	65	40
Switzerland	--	--	5	3	2
United Kingdom	5	--	5	--	--
United States	14	2	9	9	11
Venezuela	3	3	--	2	--
Others	32	4	3	26	10
Total	411	290	318	347	468

[1] Data revised; conversion factor changed to boxes of average net weight of 42 pounds as packed in Chile.

Official records Chilean customs.

inces, Curico Province, and San Fernando in Colchagua Province.

According to a 1953 survey, the Angol-Los Angeles area had more than 3,000 acres of apples--about 1,700 in Bio-Bio and 1,600 in Malleco. Production is slightly higher in Malleco as average yields are higher than in Bio-Bio. Average yields per tree were reported by the survey at 1.6 boxes in Bio-Bio and 2.2 boxes in Malleco; average for the total area was 1.9 boxes per tree.

Production has increased somewhat since this survey was made as yields are up slightly. Increases have not been great, however, and the relative positions have changed very little. Average yields for the area are now about 2.5 boxes per tree; highest yields are about 5 boxes per tree. Trees are extremely slow growing in some very sandy soils. Fruit quality is excellent. Apples are true to varietal form and appearance and of high color. Most varieties develop a high proportion of large sizes in most years.

Curico is rapidly becoming the most important Chilean apple area, with substantial plantings during recent years which are now coming into production. Curico now produces approximately 30 percent of the Chilean crop. Almost all producing trees in this section are 5-8 years old, and new plantings continue. Consequently, substantial production increases are predicted for the area. Ministry of Agriculture officials estimate that Curico production in 5 years will equal 1 million bushels and eventually will be greater than the present total production of Chile.

As soils in Curico are somewhat better and less sandy than those of Angol, yields are only slightly higher, averaging about 5 boxes per tree, but trees come into production more normally, at about 5-6 years. Average quality of fruit is good; the best is as good as in Angol. But, Curico fruit shows a wider range of quality and a smaller percentage of the total in the top grades.

San Fernando is an area of both old and young trees and in certain sections has excellent soil. Yields on 27-year-old trees are averaging 18 boxes per tree in orchards on this good soil. Such yields are extremely infrequent, however, and yields comparable to other Chilean areas occur in most of the sections. The average yield for Chile as a whole is no more than 5 boxes per tree.

Costs.--On older, well-established orchards in the Bio-Bio area it was possible to develop detailed cultural cost breakdowns, and these figures (Table 8) are representative of the area. Such detail was not available in other areas. But, by applying total production of a few orchards to quoted figures of the total expenditures for cultural items, it was determined that total cultural costs per packed box in the Curico-San Fernando sections is about

TABLE 8.--Apples: Average cultural costs, Bio-Bio-Malleco area of Chile, 1957-58 season

Cultural item	Average cost per acre	
	Pesos	*Dollars*
Cultivation and maintenance of plantation	1,840	2.54
Pruning	2,040	2.82
Irrigation	2,900	4.00
Maintenance of canals and water rights	1,820	2.51
Materials:		
Fertilizer	7,800	10.76
Pesticides	35,300	48.71
Labor:		
Salaries and wages	8,600	11.87
Miscellaneous benefits (Soc. Sec., meals furnished etc.)	210	.29
General administrative expense (including insurance)	8,000	11.04
Taxes and interest	1,330	1.84
Miscellaneous expenses:		
Maintenance of fences and roads	26,500	36.57
Maintenance of buildings	3,900	5.38
Spare parts for machinery and shop costs	4,300	5.93
Forage and animal feeds	2,200	3.04
Total costs per acre	106,740	147.30
Total costs per box[1]	427	.59

[1] Converted to per box cost on basis of average yield in area of 250 boxes per acre.

TABLE 9.--Apples: Cost of harvesting and packing, by cost item and area, Chile, 1957-58 season

Cost item	Angol-Los Angeles		Curico		San Francisco	
	Pesos	*Dollars*	*Pesos*	*Dollars*	*Pesos*	*Dollars*
Picking	20.00	0.028	20.50	0.028	21.00	0.029
Packing materials (Box, paper, etc.)	309.00	.426	305.00	.421	304.00	.420
Label	6.00	.008	5.50	.008	5.00	.007
Marking box	3.50	.005	3.50	.005	3.50	.005
Packing labor and social security	52.50	.072	51.00	.070	40.50	.056
Miscellaneous expenses, insurance, etc	47.50	.066	43.50	.060	42.00	.058
Total cost per packed box	438.50	.605	429.00	.592	416.00	.575

385 pesos ($0.53). Probably the slightly lower costs in these latter areas is the result of the somewhat higher yields obtained.

Harvesting and packing costs were more readily available in detail and are shown together (Table 9) for easy comparison of the three major areas. It will be noted that the costs in the different areas are very similar, and that again the lowest cost shows up for the areas with the highest unit yield. Individual costs shown may vary between areas to some extent because of the inclusion of a particular cost under different headings in different areas. However, the cost relationships and the total costs per box are representative of the individual areas and are comparable.

Packing and shipping.--Apple orchards are chiefly active in the production of apples specializing in this fruit although some farms have trees of other species such as pears and cherries.

Each plantation has its own packing operation in most cases. The equipment is owned by and the packing is under the direction of the owner of the orchard. Packing houses are equipped with rotary or stationary bin-type grading and sorting lines such as those used 20-25 years ago in the Western United States. In older houses these machines were imported from the United States and are still in operation. Machinery in the newer, more recently established packing houses is of the same type but of Chilean manufacture. Apples are packed in standard boxes averaging 42 pounds net weight.

Most apple exporting is done by either Compania Frutera Sud Americana (South American Fruit Company), shipping under the SAFCO label, or Asociacion Productores de Manzanas y Peras de Chile (Apple and Pear Producers Association of Chile), using the ASPROMAN trade mark. Most grower-packers operate their sheds under contract to one or the other of these two organizations, shipping the packed fruit to Santiago or Valparaiso as directed by the recipient organization.

SAFCO handles a large percentage of the fruit packed for export in Chile including, in addition to apples, pears and other fresh fruits, some dried peaches, and prunes. In some cases, SAFCO owns and operates orchards, packing plants, and processing plants in addition to the fruit it purchases from private growers and packers.

Pears

Pears are at present relatively unimportant in Chile. Some are grown in almost every fruit area of the country but there are no concentrated plantings; instead pears usually are planted in small numbers in conjunction with a commercial planting of some other kind of fruit. Overall acreage is low, and the exports are not now significant. But, plantings have been accelerated and a large increase in production is expected in the next 10 years.

Varieties now important in Chile are Packham Triumph, Anjou, Winter Nelis, Easter Beurre, Bosc, Comice, Winter Bartlett, and Salvador Izquierdo. The first three are the most important for export and are grown in the greatest volume.

Methods of handling and packing of the small export pack is much the same as used on apples, and the pears packed for export are packed by growers who are packing apples as a main line. Pear boxes are packed with an average net weight of about 40 pounds. In the past few years, interest in pears has grown and more trees have been planted. Some of these are now coming into bearing, and pear production and exports will likely continue to increase slowly.

Stone Fruits

Stone fruits grown in Chile include peaches, nectarines, plums, apricots, and cherries. The first three types are grown in the greatest volume and are the only ones important in the export trade; all three are exported in

TABLE 10.--Pears, fresh: Exports from Chile by country of destination, average 1948-53, annual 1954-57[1]

Country of destination	Average 1948-53	1954	1955	1956	1957
	Boxes	*Boxes*	*Boxes*	*Boxes*	*Boxes*
Brazil	2,884	--	--	--	--
Costa Rica	64	55	--	440	11
Cuba	1,084	--	--	--	--
Germany	--	--	--	495	--
Ecuador	266	551	165	440	116
Netherlands Antilles	753	441	220	--	--
Panama	2,186	276	--	165	--
Peru	6,706	8,653	9,480	9,867	16,369
Sweden	7,615	9,094	4,905	13,893	--
United Kingdom	276	551	--	--	3,737
United States	5,025	3,528	11,850	13,563	5,512
Venezuela	1,736	5,456	1,488	1,980	1,433
Others	855	110	--	1,320	11
Total	29,450	28,715	28,108	42,163	27,189

[1] Data revised; conversion factor changed to boxes of average net weight of 40 pounds as packed in Chile.

Official records Chilean customs.

TABLE 11.--Stone fruits, fresh: Exports from Chile by country of destination, average 1948-53, annual 1954-56

Country of destination	Average 1948-53	1954	1955	1956	1957
Peaches and nectarines:	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Ecuador	100	--	184	--	--
Netherlands Antilles	84	92	--	--	--
Panama	498	138	92	92	--
Peru	627	1,332	551	505	487
United States	26,325	28,889	39,086	30,083	56,980
Venezuela	161	597	229	138	643
Others	46	--	--	--	45
Total	27,841	31,048	40,142	30,818	58,155
Plums:	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Panama	11	7	2	11	--
Peru	6	8	3	1	2
United States	484	726	530	647	530
Venezuela	34	107	81	59	52
Others	5	23	3	--	--
Total	540	871	619	718	584

Official records Chilean customs.

fresh form. Also, plums are dried and peaches are canned, both in important quantities.

While these fruits are grown in many areas of Chile commercial production of peaches is centered in Aconcagua, Santiago, and Valparaiso Provinces in the order of their importance. Nectarines are grown from Aconcagua to Colchagua Provinces; plums between Santiago and Talca; and cherries from Santiago to Bio-Bio.

Varieties. --Leading variety of peach now grown in Chile is Phillips Cling, which has been very popular there for some time. Ministry of Agriculture officials and processors have been recommending its replacement with higher quality varieties with some success. However, Phillips continues as the most important canning variety and probably will continue to lead for some time. Other varieties grown for canning are Pomona and Reina Elena.

For fresh market Elberta, J.H. Hale, Charavizano and American Nectar plus some early varieties such as Mayflower and Waterloo are grown. Some Phillips and Reina Elena are sold to the fresh market also. The Ministry is now recommending Early and Fay Elberta, Rio Oso Gem and Dixired.

The leading variety of nectarine is Incomparable. Plums for drying are chiefly D'Agen, President and Imperial. For fresh consumption the important varieties are Santa Rosa, Climax and a few Wickson and Reina Claudia. Both sweet and sour cherries are grown with the sweet types most important. D'Annonay, Corazon de Paloma (Napoleon), Bing and Black Tartarian are grown. Sour cherries are mostly of local selection but there are some Early Richmond and Montmorency.

Packing and shipping. --Fruit is hand picked and transported to the packing house in field boxes. It is packed in 2-layer lugs; fruit individually wrapped in paper. Lugs are packed with a net weight of 19 pounds for peaches, 16 pounds nectarines, and plums 15 pounds. Bulge is small. This pack has been very satisfactory for shipments to New York and losses in transit are minimized.

Cost of packing in the Aconcagua Valley (Table 12) is quite similar to costs for grapes in the same area as the two products are handled similarly. Fruit costs for stone fruits are higher than grapes, chiefly because of lower per acre yields.

Fruit for fresh export is handled under refrigeration and moved much in the manner of table grapes. In the past, exports of fresh stone fruits have been relatively small compared to other kinds of fruit. Today, there is some activity toward increasing this trade, and it will very likely be successful, although the increases will be small and gradual. Chief markets are New York, Peru, and Venezuela.

Melons

Honeydew melons are important in Chile's export trade, with the United States the major customer. Production is centered in Llay Llay Valley and the southern part of Santiago Province. Honeydews are the only type of melons grown for export. Watermelons are also grown in volume but are not exported.

Melons are planted first in November in Chile and normally two crops are grown. Yields average about 600 packed crates per acre from the early crop and about 500 from the late crop. In some areas--particularly the Llay Llay Valley--the practice is to plant garlic in May. Melons are then planted over the garlic in November, and the garlic harvested in December. Where this is done, fertilizer is applied to both garlic and melon crops.

Packing and Shipping. --Honeydews are harvested all at one time when the field is ready and the melons gathered in large piles near the edge of the field. When picking of the field is completed, they are loaded bulk in trucks or oxcarts for transport to a central packing shed. This shed is usually a lean-to type of building knocked together in a convenient location.

Packing is usually a hand operation. A few plantations were observed where melons were being packed in the field as they were picked, but this is the exception and is done only when the grower is also the exporter. It is more common for the grower to sell the melons bulk in the field to an exporter who hauls them away to be packed.

Melons are packed in large crates with excelsior padding and handled much the same as other fruit in that shipments are timed to arrive at the dock so they can be loaded directly into the ship after inspection. Rail cars are unloaded into slings which move the fruit to the hold, as the rail siding is on the dock alongside the ship. Trucks are unloaded onto pallets, which are then moved by fork-lift trucks to the crane for loading abroad ship. Occasionally fruit or melons are stacked in the shed on the dock awaiting loading but this is normally a short wait.

Melons usually arrive in New York in good condition but frequently lots suffer substantial loss when 1 to 4 bruised or off-condition melons occur in a crate of 8 to 11 melons. Obviously with the system of handling used in Chile, melons delivered to the packing shed are in all degrees of ripeness, including some too green to ripen properly and others too ripe to make the trip to market. The most important step that can be taken in Chile is the establishment of strict quality control at the packing shed to preclude the packing of melons which are not at the proper stage

TABLE 12.--Stone fruits: Calculated packing costs in Chile, by species and cost item, 1957-58 season

Cost item	Peaches[1]		Plums[1]		Nectarines[1]	
	Pesos	*Dollars*	*Pesos*	*Dollars*	*Pesos*	*Dollars*
Lug..........................	140.00	0.193	140.00	0.193	140.00	0.193
Paper........................	200.00	.276	200.00	.276	200.00	.276
Corrugated cardboard..........	20.00	.028	20.00	.028	20.00	.028
Nails........................	5.00	.007	5.00	.007	5.00	.007
Cost of fruit, average[2]........	768.00	1.060	584.00	.806	624.00	.861
Packing labor.................	182.00	.251	138.00	.190	150.00	.207
Total cost per lug, f.o.b......	1,315.00	1.815	1,087.00	1.500	1,139.00	1.572
Freight to port and icing car..	151.55	.209	121.60	.168	124.70	.172
Total cost per lug, f.a.s......	1,466.55	2.024	1,208.60	1.668	1,263.70	1.744

[1] Per packed lug, average net weight: Peaches 19 lbs.; plums 15 lbs.; nectarines 16 lbs.
[2] Delivered packinghouse basis.

TABLE 13.--Honeydew melons: Exports from Chile by country of destination, 1952-57

Country of destination	1952	1953	1954	1955	1956	1957
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Canada........................	--	2	32	15	26	8
Cuba..........................	10	30	11	29	--	--
Panama........................	10	12	2	3	--	--
United Kingdom................	4	30	409	763	970	674
United States.................	3,613	4,509	3,691	3,426	4,200	3,180
Venezuela.....................	1	2	9	4	22	3
Others........................	3	49	142	6	--	[1] 46
Total.........................	3,641	4,634	4,296	4,246	5,218	3,911

[1] Netherlands.

Official records Chilean customs.

of ripeness to arrive in good condition in New York.

Education of packinghouse workers is the first step and quite a difficult one to surmount. In Chile, a misplaced sense of loyalty works to the disadvantage of the shipper. Workers normally will pack any borderline fruit, feeling that they are helping the "Patron" since they know that export fruit sells at higher prices than domestic. They do not realize what happens to the price of the entire lot if this borderline fruit arrives at destination bruised or showing decay.

Grape packers, to a large extent, have overcome this problem. But success has been achieved only through a very close supervision of workers plus a system of bonuses to the workers who turn out the best pack. A similar system is needed in melon-packing if the in-transit losses are to be reduced.

CANNED FRUIT

The most important products for canning in Chile are peaches and tomatoes, and, by comparison, production of other canned fruits is small. Fruit canning is most important in Aconcagua and Santiago Provinces.

At present, only one plant in the country--in Aconcagua--is packing for export. Most others are planning to reenter the export market in the next season or so, as a result of recent government actions to allow importation of tinplate. Chilean manufactured plate is very irregular, and canners prefer to use U. S. plate.

TABLE 14.--Fruit, deciduous: Utilization in Chile, 5-year average 1952-56[1]

Fruit	Fresh	Canned	Dried		Other	Total
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Apples	62,800	--	150	--	[2] 750	63,700
Pears	6,400	140	100	--	--	6,640
Peaches	26,800	[3] 2,900	[4] 1,400	[5] 2,600	--	33,700
Apricots	1,200	[3] 1,800	680	--	--	3,680
Plums and prunes	3,700	[3] 2,300	11,900	--	--	17,900
Grapes	76,500	--	3,700	--	[6] 5,100	85,300

[1] Fresh fruit basis.
[2] Principally cider.
[3] Includes preserves.
[4] Dried pitted.
[5] Dried not pitted.
[6] Principally wine.

Ministerio de Agricultura--Chile.

The government now allows free import of tinplate and sugar for packing for export, at the same time, stipulating that the total amount of duty-free plate imported must be exported. The importer is required to obtain a license and deposit 400 percent of the f.o.b. value of the plate. The shipper is paid from this deposit, and the balance is remitted to the importer within 90 days after receipt of the goods. If some of the plate is not reexported, the importer is required to pay duty on the full amount imported. Thus, U. S. plate is generally ordered only for packing for previous firm orders or for relatively certain export prospects.

The tinplate problem will be alleviated to some extent in the near future, since a plant is now being constructed in Chile to produce cold-rolled plate. This plant is being equipped with American machinery and is expected to be operating for the 1959-60 season. Currently, canners buy both plate and collapsible cans from the U. S. and have small can-making machinery in their canning plants.

Grading. --The canning industry has adopted what is referred to as "the California system" in grading canned fruit. For comparative purposes, the following abstracts have been translated from the official Chilean processed fruit standards:

Canned peaches--Basis No. 2-1/2 Can--packed halves

Class	No. halves per can	Concentration of syrup	Description
		Percent	
Fancy (Fantasia)	6-12	55	Fruit of very good color, mature but retaining form, healthy, free of defects, halves uniform in size and shape.
Choice (Especiales)	6-15	40	Fruit of very good color, mature but retaining form, without defects, uniform in size and shape.
Standard (Corrientes)	6-21	25	Fruit good color and reasonably free of defects, halves reasonably uniform in size, color, maturity, and shape.
Second (Segundo)	Variable	10	Some defects are tolerated. Halves should be more or less uniform in size, color, and grade of maturity.
Pie (Postre)	Variable	0	Fruit not appropriate for classes listed above.

TABLE 15.--Peaches, canned: Approximate average costs of canning in Chile, 1957-58 season

Cost item	Amount	
	Pesos	Dollars
	Per case[1]	*Per case*[1]
Cost of tinplate and manufacture of cans	2,200.00	3.036
Sugar	700.00	.966
Labor including social security	400.00	.552
Labels	200.00	.276
Box, wooden	200.00	.276
Miscellaneous, administration, etc	400.00	.552
Total packing costs	4,100.00	5.658
Cost of fruit[2]	2,000.00	2.760
Total cost f.o.b. plant	6,100.00	8.418
Freight to Valparaiso[3]	150.00	.207
Total cost f.a.s	6,250.00	8.625

[1] Case of 48 No. 2 cans.

[2] Per case cost calculated on basis of average price to grower of 60.00 pesos per kilo and conversion factor of 35 kg. fresh to pack 1 case.

[3] Average cost from major canning areas.

Packing.--Fruit is packed in cans of the same sizes used in the United States with the No. 2 and 2-1/2 prevailing. No. 2s are packed 48 and 2-1/2s packed 24, both in wooden cases when for export. Specifications of cans used in Chile are outlined in the following data:

Can sizes used for fruit in Chile

Size	Dimensions[1]
No. 1	[2] 211x400
No. 2	306x409
No. 3	404x414
No. 10	603x700

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[1] Converted from Chilean specs published in centimeters.

[2] In U. S., No. 1 picnic.

The estimated average cost of packing and delivery to port during the 1957-58 season of a case of 48/2s of peaches was $8.63. At this time, the average selling price f. o. b. plant was $10.00-$10.50 per case.

New machinery is not available to Chilean canners, although they can get replacement parts. A great deal of hand labor is used in the plants visited, yet, despite this, expansion of production is moving forward and most canners are looking ahead to substantial increases. Some are predicting the canned-peach pack will double in the next 5 years.

Outlook.--Domestic demand exists for only three canned products--peaches, tomatoes, and peas--and is not likely to increase sharply. Any substantial increases will depend on the reopening of the export market in Peru and Venezuela, particularly. Fruit production in the canning areas is already sufficient to support increased packing and can readily be expanded further.

The upturn in exports will be tempered to some degree by the lack of investment capital and new machinery. When capital becomes available and machinery can be obtained, the industry will be able to reduce costs and the resultant drop in retail prices could lead to the first increase of any magnitude that has been experienced in Chilean canned foods consumption.

TABLE 16.--Peaches, canned: Exports from Chile by country of destination, average 1950-53, annual 1954-57

Country of destination	Average 1950-53	1954	1955	1956	1957
	Cases[1]	*Cases*[1]	*Cases*[1]	*Cases*[1]	*Cases*[1]
Denmark......................	--	--	--	(2)	1,014
Ecuador......................	748	51	--	(2)	704
Germany......................	--	--	--	(2)	5,595
Peru.........................	11,350	8,109	14,140	18,078	32,618
United Kingdom...............	420	--	--	(2)	--
Other........................	114	--	--	[3] 4,779	[4] 41
Total......................	12,632	8,160	14,140	22,857	39,972

[1] Cases equivalent 24 No. 2-1/2 cans.
[2] If any, included in others.
[3] Complete country breakdown not available.
[4] Bolivia.

Official records Chilean customs.

DRIED FRUIT

The only dried fruit produced in Chile which is of importance in foreign trade is prunes. Raisins are produced in quantity but are largely sold on the domestic market. Dried peaches and small quantities of other dried fruits are also produced.

Prunes are grown chiefly for export to Europe, with Denmark the largest buyer. Other important markets are Brazil and Peru. In recent years, prices to farmers have been very low. In 1957 commercial sales of prunes in Chile were distributed 88 percent to export and 12 percent domestic. In 1956, exports took 85 percent with 15 percent moving domestically.

Prune production has, from the growers' standpoint, been an unprofitable deal in recent years. Now, however, increased exports are expected, and the industry is looking forward to improving its position.

Prunes are grown and dried throughout the central valley in all except the southernmost provinces, with small drying plants scattered throughout the area. Some, operated by the government, dry fruit for a fee for the growers, who then can have it graded and sold or returned to them for home use.

D'Agen is, by far, the most important variety grown for drying, providing about 90 percent of the total production. For export, prunes are packed bulk in wooden boxes of about 25 pounds net weight.

Costs.--It is difficult to determine exact cost figures on the Chilean prune industry. But, for the country as a whole, the trade estimates that total processing and packing costs, including materials, and so forth, average about 4.5¢ per pound. Cost of the raw fruit during the 1958 season was 1¢ per kilo (2.2 lbs.). Thus, at the average conversion of 3 pounds fresh to 1 pound dry, the calculated cost of the packed product at f.o.b. shipping points is 6¢ per pound.

The freight rate to the port ($28.00 per ton) adds 1.3¢ per pound, thus the average cost f. a. s. Valparaiso is 7.3¢ per pound. Adding the ocean freight to European ports (2.3¢ per pound) gives a total calculated cost of about 10-12¢ per pound. Assuming possible additional charges, such as insurance, loading and unloading, and others, the maximum break-even cost for delivering Chilean prunes to European ports is about 14-15¢ per pound.

TABLE 17.--Prunes, dried: Exports from Chile by commodity and country of destination, average 1948-52, annual 1953-57

Country of destination	Average 1948-52	1953	1954	1955	1956	1957
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Brazil	1,680	--	63	252	108	6
Denmark	380	3,413	2,650	1,625	1,011	951
Finland	--	--	--	702	306	--
Germany	190	606	192	1,538	674	1,626
Italy	--	--	--	--	--	321
Netherlands	45	442	--	13	--	619
Norway	65	--	--	--	--	5
Peru	140	129	54	50	77	62
Sweden	355	7	8	--	1	--
United Kingdom	95	60	--	--	11	653
Others	30	15	7	20	46	19
Total	2,980	4,672	2,974	4,200	2,234	4,262

Official records.

TABLE 18.--Prunes: Distribution of production in Chile, by sizes, 1955-57

Size	1955	1956	1957
	Percent	*Percent*	*Percent*
50s and larger	14.0	19.9	8.8
50/60	12.9	14.6	12.0
60/70	13.6	14.0	13.9
70/80	10.3	11.9	12.4
80/90	9.2	10.6	13.3
90/100	10.8	7.0	8.3
100/120	8.0	7.8	12.0
120 and smaller	21.2	14.2	19.3
Total	100.0	100.0	100.0

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DOMESTIC AND EXPORT OUTLOOK

Domestic Markets

Chile's consumption rate of deciduous fruit is relatively high by comparison with other South American countries. Fruit is a part of almost every meal. However, the fruit-packing industry packs primarily for export and the domestic market receives what is left--mostly fruit graded out of the export pack. This means that the domestic market is an excellent outlet for off-grade fruit and normally does not compete with the export market for supplies.

The Chilean industry realizes the importance of this market and, in cooperation with the Ministry of Agriculture, has launched a campaign to increase per capita fruit consumption. The program cites present levels as compared with those of the United States and is based on the peoples' need for a properly balanced diet to which fruit would contribute materially.

Chile has no single large central market and distribution point for domestic fruit like Buenos Aires in Argentina. Instead, each area of the country is relatively close to a fair-sized population center and also ships some fruit to the larger cities, such as Santiago, Valparaiso, and Concepcion. This provides a market organization quite different from that of Argentina, and in some respects, Chile's domestic market is more stable.

Exports

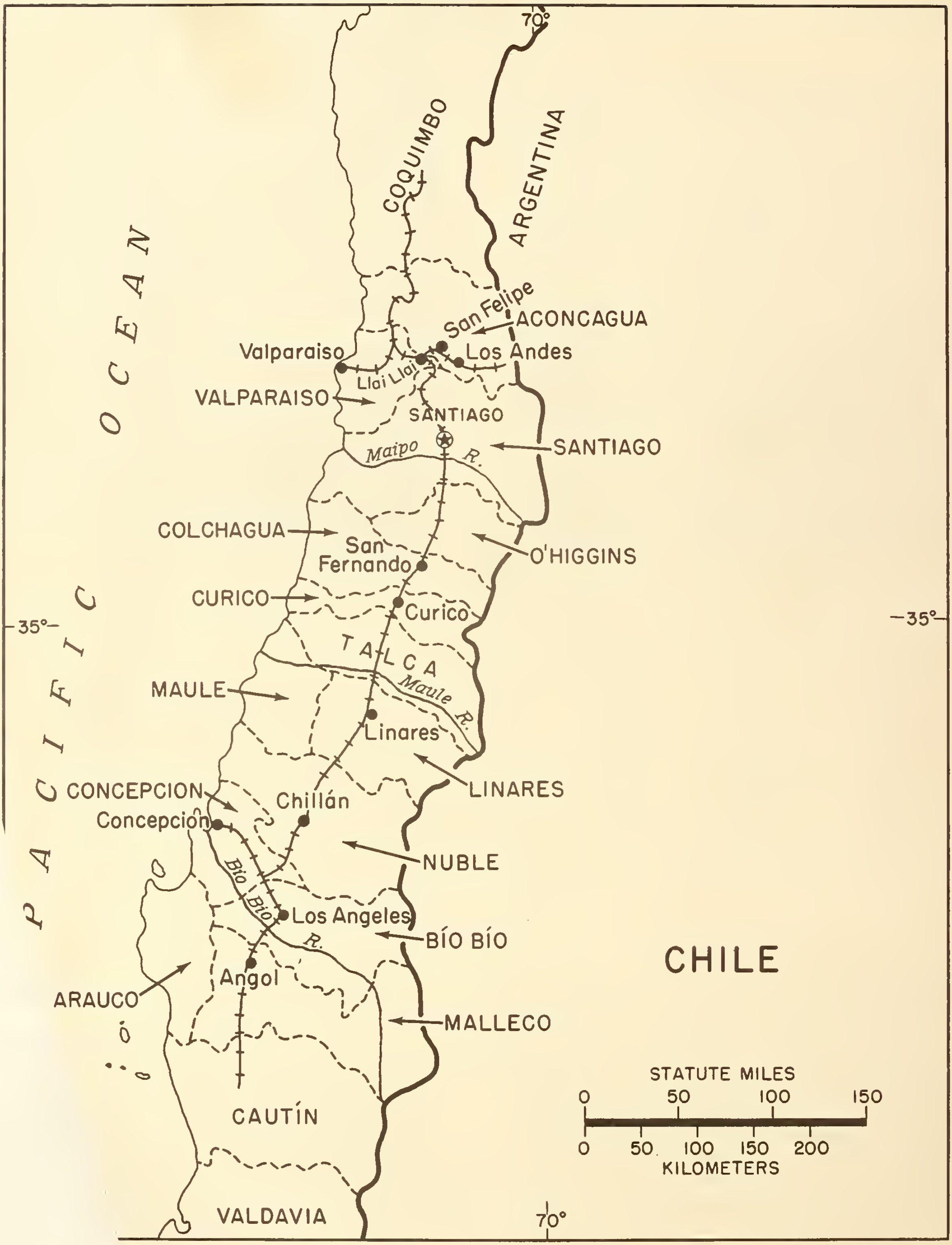
In the next few years, Chilean exports of all kinds of deciduous fruit will increase. Most of the initial increase will be a regaining of traditional markets lost in recent years, and these gains are most likely to occur for apples to Europe and canned fruit to Peru and Venezuela. The improvement in exchange rates, repeal of export taxes and the renewal of a trade agreement with Peru granting Chile certain preferential duty rates are all contributing to this increase.

Fresh fruit.--In addition to the gains in exchange rates, increasing production trends in Chile are contributing to the drive toward a higher export level. Chile may be expected to regain some outlets in Europe for apples and may offer Argentina greater competition in South American countries.

The fresh fruit with the greatest potential and the one in which exports are likely to show the greatest percentage increase is table grapes. Stone fruits are next. The chief market for these products is the United States. With these shipments arriving in the U. S. "off-season," there is no reason to expect any reversal in the upward trend as long as Chile maintains its high level of grading and quality control. Shipments of honeydew melons to the United States will probably continue to increase too, but at a much slower rate.

Canned fruit.--Substantial increases in exports of canned fruit, chiefly peaches, may be expected. With tinplate again available, canners are universally looking toward exports for an increase in sales. The major increase in this line will be to South American countries, and U. S. canners may expect increased competition in such markets as Peru and Venezuela.

Dried fruit.--The dried fruit industry of Chile is now looking toward its old markets and hopes to be able to increase its shipments. The important commodity in this category is prunes and the major market is in Europe. Increases will undoubtedly be slow but Chile is again on the upgrade. Therefore, the U. S. dried fruit industry should expect a gradual regrowth of competition in European markets in coming years.


70°
COQUIMBO
ARGENTINA
PACIFIC OCEAN
San Felipe
ACONCAGUA
Valparaiso
Los Andes
Llai Llai
VALPARAISO
SANTIAGO
SANTIAGO
Maipo R.
COLCHAGUA
O'HIGGINS
San Fernando
CURICO
Curico
35°
35°
TALCA
MAULE
Maule R.
Linares
LINARES
CONCEPCION
Chillán
Concepcion
NUBLE
Bío Bío R.
Los Angeles
BÍO BÍO
ARAUCO
Angol
MALLECO
CAUTÍN
VALDAVIA
70°
CHILE
STATUTE MILES
0 50 100 150
0 50 100 150 200
KILOMETERS